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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/524,298

07/28/2005

Jean-Pierre Gaechter

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EXAMINER

PILKINGTON, JAMES

ART UNIT

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/524,298	Applicant(s) GAECHTER, JEAN-PIERRE	
	Examiner JAMES PILKINGTON	Art Unit 3656	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 April 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 53-66 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 53-66 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 5/13/05 fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each cited foreign patent document; each non-patent literature publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. It has been placed in the application file, but the information referred to therein has not been considered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 53-59 and 61-63 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan, USP 2,756,609, in view of Brusasco, USP 4,138,902 and further in view of Barrett, USP 2,299,785.

Hogan discloses an actuator comprising:

- An outer tubular body (34)
- An inner tubular body (21/22) having a portion positioned inside said outer tubular body (34)
- a nut assembly (between 31 and 32) inter connected to said inner tubular body (21/22), said nut assembly (between 31 and 32) having at least one helical ball race (opposing faces 36 make race) having a helical portion

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extending circumferentially for less than 360 degrees around said nut assembly (length of 36 connecting the two ends of 39), said helical ball race (36) having a widened portion (at 39) connecting to a first end and a second end of said helical portion (36), said nut assembly further comprises a plurality aligned elements (each disk 28) each of a cylindrical shape (see Figure 7), each of said plurality of aligned elements (28) having at least one bevel (36) defining a helical cam surface, the helical cam surface (36) of one of said plurality of aligned elements defining the helical ball race with the helical cam surface of another of the plurality of aligned elements and the plurality of aligned elements define a plurality of ball races

- a plurality of balls (38) received between the helical ball race (36) and an inner surface of said tubular body (34)
- said widened portion (39) defining a re-circulation zone for the balls (38) arranged between the ball-race and the inner surface of the tubular body (34)
- a driving means (20/21) cooperative with said nut assembly (between 31 and 32) for rotating the nut, in order to ensure the displacement in translation of the tubular body (34) with respect to the nut the inner face of the first tubular body comprises helical ball-races for guiding the balls
- wherein said nut comprises a plurality ball races (one between each disk 28), each of the ball-races having a re-circulation zone (39) for the balls e

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re-circulation zones for the balls are not aligned in a direction of translation of the actuator (the mating re-circulation zone of the next disk is offset and therefore not aligned in a direction of translation)

- wherein the ball- races are so arranged that the re-circulation zones (39) are regularly angularly distributed about the direction of translation of the actuator (since the re-circulation zones are not in a line they are regularly angularly distributed in so much as there angular pattern/location is predictable, see Figure 2)
- wherein the ends of each helical cam surface (36) defines a setback (at 39), a pair of aligned elements (28) being positioned with respect to each other such that the setbacks (39) are facing each other, said setbacks (39) defining the re-circulation zone for the balls (38) (see Figure 2)
- wherein said plurality of aligned elements (28) are tightenable with respect to each other (clamped together by spring 33 and nut 24)
- a nut member (24) cooperative with said plurality of aligned elements (28) so as to adjust the tightening of the elements (28)
- each of said plurality of aligned elements (28) having a cross-section with a beveled circular edge (36), the helical cam surface being inclined relative to an axis of said cylindrical shape, the helical cam surface having ends connected by a setback (39) surface of a generally conical shape

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- wherein the helical ball races in the inner surface of the outer tubular body (34) are formed by plastic distortion of said plurality of balls (balls press against inner side of outer tube)

Hogan does not disclose that the first tubular body comprises a helical ball race formed on an inner surface thereof so as to be suitable for guiding said plurality of balls and the race is substantially equal to the helical pitch of a ball race of the nut.

Brusasco teaches a first tubular body (15) that comprises a helical ball race (for balls 4) formed on an inner surface thereof (15 is a block attached to the inner surface which makes the grooves "formed on", this arrangement is similar to the inserts shown in Applicants drawings) so as to be suitable for guiding said plurality of balls and the race is substantially equal to the helical pitch of a ball race of the nut for the purpose of assuring the pitch movement of the balls and the moving body are correct (C1/L48-52).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan and provide the first tubular body with a helical ball race formed on an inner surface thereof so as to be suitable for guiding said plurality of balls and the race being substantially equal helical pitch of a ball race of the nut, as taught by Brusasco, for the purpose of assuring the pitch movement of the balls and moving body are correct.

Hogan and Brusasco disclose all of the claimed subject matter as disclosed above. Hogan further discloses that the drive means is a motor (20).

Hogan and Brusasco do not disclose that the motor is mounted fixed inside a second tubular body being drivable in translation with respect to the first tubular body.

Barrett teaches a motor (20) that is mounted fixed inside a second tubular body (11) being drivable in translation with respect to the first tubular body (17) for the purpose of providing an actuator that has a low manufacturing cost, simply construction and an extremely low capacity coupling with ground with a high leakage resistance to ground (C1).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan in view of Brusasco and provide a motor that is fixed inside a second tubular body being drivable in translation with respect to the first tubular body, as taught by Brusasco, for the purpose of providing an actuator that has a low manufacturing cost, simply construction and an extremely low capacity coupling with ground with a high leakage resistance to ground.

4. Claim 60 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan '609 in view of Brusasco '902 and Barrett '785.

Hogan in view of Brusasco discloses all of the claimed subject matter as applied above. Hogan further discloses the use of a spring (33).

Hogan in view of Brusasco does not disclose that the spring is between the nut and the aligned elements.

It would have been obvious to one having ordinary skill in the art to arrange the spring between the nut and the aligned elements since rearranging the location of the

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spring would have been obvious to try and would still yield the predictable result of subjecting the balls to a radial thrust against the outer tube (c2/l64-70). If the spring is located at the end of the nut assembly or between the nut and the aligned elements in Hogan the function of the spring does not change.

5. Claim 64 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan '609 in view of Brusasco '902 and Barrett '785 and further in view of Halasy-Wimmer, US PGPub 2004/0093973.

Hogan in view of Brusasco and Barrett discloses all of the claimed subject matter as disclosed above.

Hogan in view of Brusasco and Barrett does not disclose an interior tube within the outer tubular body, the interior tube comprising the ball-races.

Halasy-Wimmer teaches an interior tube (8) arranged in the tubular body (9), the interior tube (8) comprises the ball-races for the purpose of providing a device with a considerable reduction in manufacturing costs due to non-cutting fabrication (paragraph 0004).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan in view of Brusasco and Barrett and provide an interior tube arranged in the outer tubular body, the interior tube comprising the ball-races, as taught by Halasy-Wimmer, for the purpose of providing a device with a considerable reduction in manufacturing costs due to non-cutting fabrication.

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6. Claim 65 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan '609 in view of Brusasco '902 and Barrett '785 and further in view of Yapple, USP 5,358,265.

Hogan in view of Brusasco and Barrett discloses all of the claimed subject matter as disclosed above.

Hogan in view of Brusasco and Barrett does not disclose another tubular body, the outer tubular body being connected to another nut, rotation of the another nut causing the displacement in the translation of the another body with respect to the outer tubular body.

Yapple teaches a multiple tube system comprising an additional tubular body (16c), a first tubular body (16b) being connected to a second nut (72 on 16c), rotation of the second nut causing displacement in the translation of the additional body (16c) for the purpose of providing an actuator comprising at least three telescoping members which allows for additional length of actuation (C4/L1-33).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan in view of Brusasco and Barrett and provide another tubular body, the outer tubular body being connected to another nut, rotation of the another nut causing the displacement in the translation of the another body with respect to the outer tubular body, as taught by Yapple, for the purpose of providing a device with a considerable reduction in manufacturing costs due to non-cutting fabrication.

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7. Claim 66 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hogan '609 in view of Brusasco '902 and Barrett '785 and further in view of Laskey, USP 6,101,889.

Hogan in view of Brusasco and Barrett discloses all of the claimed subject matter as disclosed above.

Hogan in view of Brusasco and Barrett does not disclose that the outer tubular body is made of aluminum, KEVLAR, carbon fibers or molded plastic.

Laskey teaches a tubular body made of aluminum (C3/L8-19) for the purpose of providing a material suitable for the load.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Hogan in view of Brusasco and Barrett and provide for the outer tubular member being made out of aluminum, as taught by Laskey, for the purpose of providing a material suitable for the load being handled.

Response to Arguments

8. Applicant's arguments filed 04/13/09 have been fully considered but they are not persuasive.

9. The Applicant argues that Hogan does not disclose the outer member having a helical race and that one of ordinary skill in the art would not combine Hogan and Brusasco because Brusasco discloses an arrangement that allows for varying pitch and therefore teaches away from the disclosure of Hogan.

The Examiner agrees that Hogan does not disclose a grooved/cutout helical race on formed on the outer member, however this is the structure being taught by Brusasco.

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Hogan does indeed disclose a groove formed by plastic distortion as recited in claim 63. In order for the balls of Hogan to engage the outer tube there must be some distortion because the balls are pressed against the inner wall. This distortion creates a temporary helical groove in which the balls ride in. Since the claims are not claiming any particular structure of the helical race, arrangement of Hogan meets this limitation. In addition, regarding the Applicant's comments about the friction in Hogan, in order for there to be friction between the objects the objects must be pressed together in some manner by a force and the presence of a force creates distortion, which may be minor, but is still distortion which creates a groove. The examiner also notes that the limitation of plastic deformation is not found in the independent claim so any helical groove, including that taught by Brusasco, meets the limitations of independent claim 53.

With regards to there being a physical groove cutout and formed on the surface of the outer member Brusasco is being used to teach this arrangement and that the pitch of the helical groove can be substantially equal to that of the nut since Hogan does not disclose a set pitch in the groove created by the plastic deformation between the inner wall and the balls. The fact that the pitch in Brusasco varies would not stop one with ordinary skill in the art from making grooves in the outer member of Hogan that match the pitch of the nut at any given location along the axial length. In addition, as evident by the other cited references, the use of two helical races in a ball screw assembly is well known, Brusasco discloses that in addition to having a helical race on the outer member it would be obvious to make the helical race be at a complementary pitch to that of the inner member. Therefore one of ordinary skill in the art would see

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that Brusasco teaches that the pitch can be any value as long as it complements the inner pitch and is not teaching away from the use an identical pitch throughout the length of the nut and screw.

In addition to the Applicant's argument regarding the groove arrangement of Hogan in view of Brusasco (page 11), the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981). In this case, Brusasco suggests that a physical groove can be used to engage the balls, the resulting arrangement would be similar to USP 5,358,265 (Yaple).

10. The Applicant argues on page 11 that the pitch of the screw is not defined by two successive helical grooves of the screw.

The Examiner does not understand this argument since this feature is not recited in any of the claims. Additionally the pitch of a helical shape or sloped arrangement is defined as a rise over run of any point within the helical shape or slope not a comparison on or relation between two separate grooves/helical shapes. An independent helical groove has its own pitch. In the case of Hogan the pitch is defined by the offset between the two ends a single groove.

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11. The Applicant argues on page 12 that the ability to change the pitch in Hogan would not allow the device to function with a helical groove on the outer tube.

The device of Hogan does not require that the pitch be adjust during operation. The pitch adjustment feature of Hogan is used to set a particular pitch for the device to function. The adjustment feature, when combined with a groove in the outer tube would allow a user to insert the components and then adjust the nut to change the pitch of the grooves between the disks to match the particular pitch of the grooves in the outer tube. Once the pitches are match the device would function properly and would not require any additional adjustment well the device is operating. This arrangement would indeed allow for the grooves of both members to be compatible and functional.

12. The Applicant argues that Hogan teaches away from using a groove on the inside of the outer tube.

The Examiner disagrees. Hogan teaches an arrangement where the balls of the device are subjected to a radial load which presses the balls against the inner wall of the outer tube. This pressing causes a plastic deformation in the wall of the tube which creates a helical groove, although this groove may be small it is still a helical groove which is formed in the same manner as that claimed in claim 63 of the instant application.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES PILKINGTON whose telephone number is (571)272-5052. The examiner can normally be reached on Monday-Friday 8:00AM-4:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/JAMES PILKINGTON/
Examiner, Art Unit 3656
5/12/09

/Richard WL Ridley/
Supervisory Patent Examiner, Art Unit 3656